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Setting a Standard for a Hospice or Palliative Care Referral for Acute Cancer Inpatients

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Abstract:

The objective of this research was to develop a case finding method that can be used as the basis for an hospice or palliative care referral for inpatient cancer patients.

This was a retrospective study using secondary data from administrative sources. The analysis used five years - FY2001 through FY2005 - of inpatient data from the VA National Patient Care Database (NPCD) to identify patients. VA Vital Status Files were used to ascertain each patient's date of death through March, 2006. A survival model from the index date to time of death (which was right-censored by the last date for which dates of death were known) included age, gender and the presence of metastatic disease as covariables and was estimated using the LIFEREG procedure from SAS. The 50th percentile (the median) of the predicted number of months of survival was calculated for each of the specified cancers. Categories for which median survival time was less than or equal to 12 months were preliminarily included in the case finding metric. Only about a third of patients in these categories received HPC within the VA system during a subset of study years analyzed. In summary, the intention of a case finding metric is to alert the physician to the possibility that it may be an appropriate time to discuss HPC with the patient and family members.

Key Words: Palliative Care, Survival Analysis, Inpatients

Running title: Setting a standard for a HPC Referral

Introduction

Research and anecdotal reports show the benefits of hospice and palliative care for patients and their families [1-4], but many patients do not have access to these services. In acute inpatient settings in particular, the U.S. medical culture focuses primarily on curative care and physicians are reluctant to predict when life might end. Offering comfort care may be experienced as abandonment both by the patient and physician, contributing to physicians' reluctance to broach this topic with patients.

The Veterans Health Administration (VA) has provided hospice and palliative care (HPC) to veterans since the 1970's. In the past 15 years it has formalized its commitment by requiring all VA medical facilities to establish hospice and palliative care teams, by establishing fellowship programs and veteran community partnerships and, in 2004, by establishing a national office of hospice and palliative care. An important strategic initiative of VA's national office is to improve access to HPC. VA's widespread use of an electronic medical record system would make automated case finding techniques particularly applicable. In collaboration with the VA Office of Hospice and Palliative Care, the research team focused on developing preliminary indicators that could eventually be incorporated into the electronic medical record system as an automated case-finding metric or serve as the basis for an annual report on the program.

An expert panel of VA oncologists, HPC specialists, ICU intensivists and hospital administrators assisted in identifying categories of patients at high risk of dying who might potentially benefit from HPC services. The expert panel defined high risk of dying as having a condition for which the predicted probability of dying within a year was 50% or more. Most of the conditions identified by the expert panel for potential inclusion in the case-finding metric fell

into one of four categories: cancers, chronic conditions, ICU-related events and conditions, and nursing home related events and conditions [5].

This article focuses specifically on analyses for inpatients with cancer diagnoses. It presents the median predicted months of survival for patients with each particular cancer and also separately presents median predicted survival by age and by whether or not a patient had an indication of advanced disease in the administrative record. A median equal to 12 months or less indicates that the patient had a condition with a predicted probability of dying within a year of 50% or more. The findings suggest that hospitals should regularly consider a discussion about HPC for certain inpatients admitted with a variety of cancers.

Methods

Data sources

The analysis used five years - FY2001 through FY2005 - of inpatient data from the VA National Patient Care Database (NPCD) to identify patients. NPCD is a centralized database of encounter data from each VA medical facility's clinical information system. Records, updated daily, include patient demographic information, the date and time of service, the location where the service was provided, diagnoses, and procedures [6]. VA Vital Status Files were used to ascertain each patient's date of death through March, 2006. These files combine information about date of death from VA inpatient files, Medicare enrollment files, VA compensation and pension files and social security administration data.

Study Population

Based on recommendations of the expert panel, the analyses included patients with the following cancers (associated ICD-9 codes shown in parentheses): head and neck (141-148); trachea, bronchus and lung (162); prostate (185); colon (153), liver (155), pancreatic (157),

esophageal (150), lymphomas (200-202); acute leukemias (204.0, 205.0, 206.0, 207.0, 208.0); melanoma (172), central nervous system (191) and all other cancers (all remaining ICD-9 codes 140-239). To avoid including multiple episodes for patients who were hospitalized more than once, the index date for the survival analysis was assigned as the date of the first diagnosis for each patient after at least one year in which there was no VA record of that diagnosis for the patient. This approach proxies the first time they were cared for in the VA system for any of the specified cancers. Approximately 97,000 patients were identified. Patients with more than one cancer were counted once for each condition.

Survival analysis

The survival model from the index date to time of death (which was right-censored by the last date for which dates of death were known) included age, gender and the presence of metastatic disease as covariables and was estimated using the LIFEREG procedure from SAS [7]. The 50th percentile (the median) of the predicted number of months of survival was calculated for each of the specified cancers.

Threshold for inclusion in case finding metric

To choose cancers for inclusion in a case-finding metric, we used a cut off threshold of median predicted survival time equal to or less than 12 months, which closely approximates the concept of a predicted probability of 50% or more of patients in a particular category dying within a year. The medians were arrayed not only by type of cancer, but also by age group and presence of metastatic disease. By inspection, the disease and age categories that met the threshold were identified and reported to the panel and the national director for consideration as part of future reports.

Identification of patients who receive VA HPC

One potential use of the results of this analysis is to provide information to VA Central Office as well as individual facility hospital administrators on the additional numbers of patients in VA that might benefit from HPC referrals. To provide this information for this baseline period, the research team counted how many patients in each group received VA HPC services using NPCD utilization data. NPCD identifies patients as having received HPC using one of two codes – v66.7 or TS96. According to the ICD-9-CM Codebook, v66.7 is defined as an “encounter for palliative care.” Subheadings include “end-of-life care,” “hospice care” and “terminal care.” V66.7 is always a secondary diagnosis with the underlying disease coded first. Patients were counted as having received hospice and palliative care if ICD-9 Code v66.7 was listed as a diagnosis in any of their inpatient or outpatient observations for that fiscal year. TS96 indicates that a patient was in a nursing home hospice bed.

Results

Predicted months survival time - overall

Table 1 shows the median number of months that the patients in each diagnostic group were predicted to survive. For each category, the median is delineated for two groups: inpatients with indication of advanced (metastasized) disease and inpatients without indication of advanced disease. The number of observations for the five study years is in parentheses for each cell. A median of greater than 12 months indicates that the majority of patients were expected to survive longer than a year. A median of 12 months or less indicates those conditions for which fewer than half the patients were predicted to survive the year. Shaded cells identify conditions for which the median rounds to 12 months or less.

For six types of cancer, if an inpatient was seen for the first time (in at least a year) with metastasized disease, he or she would not be expected to survive a full year after that admission (median ≤ 12 months). This initial presentation of advanced cancer in inpatients is relatively rare within the VA system and the number of inpatients who would be targeted for HPC referral using this approach was only 3,600 over the five study years. For five cancers, inpatients without advanced disease were also at high risk of dying within a year (median ≤ 12 months) and numbered over 25,000 in five years.

For the disease groups that did not meet the threshold of 12 months or less, the medians tended to be 24 to 30 months of predicted survival. Only cancers of the central nervous system approached the 12 month threshold (at 12.9 months) suggested by the experts. The team was interested to find ways to further refine the categories to better target HPC resources.

Predicted months survival time - inpatients with advanced disease, by age

Step two in the analysis was to examine median predicted months survived by age group within each cancer category (both for those with advanced disease and those without advanced disease). The shaded cells in Table 2 indicate those conditions that meet the threshold of a median predicted survival of 12 months or less. Negative numbers are an idiosyncrasy of the model and can be interpreted as a prediction that at least half the patients would survive less than one month.

This analysis highlights the impact of age. In Table 1, it appeared that patients with prostate cancer did not meet the threshold, but with age taken into account patients with advanced prostate cancer who are over the age of 85 do in fact meet the threshold. Similarly, while Table 1 could be interpreted to mean that all patients with advanced colon cancer meet the

threshold, controlling for age, we find that patients with colon cancer who are age 60 and under do not, in fact, meet the threshold.

Predicted months survival time - inpatients without advanced disease, by age

As illustrated in Table 3, the impact of age on mortality is also evident for inpatients without metastasized cancer. For all types of cancer, the median predicted months of survival declines with patient age. With the exceptions of patients with prostate, colon, lymphomas and melanoma, the predicted median months of survival of patients over age 85 is equal to or less than 12. In general, patients under age 50 (except for those with liver cancer) have median predicted survival of well over 12 months.

Cancer Diagnoses: Preliminary recommendations for inclusion in the case-finding metric

Table 4 summarizes the cancers that meet the initial criteria for inclusion in a case-finding metric. For each cancer, recommendations for referring the patients for HPC vary by age and by whether or not the patients have an indication of advanced disease. For example, for those with trachea, bronchus and lung cancer, patients with indication of advanced disease of all ages are recommended for inclusion in the case metric. All of the 867 patients identified in this category in Table 1 would be eligible for HPC referral. However, for patients with the same condition without indication of advanced disease only those patients over age 61 are recommended for inclusion in the case finding metric. Seventy-six percent (12,682 patients) of the 16,718 patients originally identified in this category (Table 1) would be eligible for HPC referral.

An important aspect of the above analysis is to consider to what extent patients identified as at high risk of dying were already offered VA hospice and palliative care. Overall, of all those who met the threshold criteria in a subset of study years analyzed, 28.2% received either hospice

or palliative care (not shown). Of those who died, 32.2% received HPC services and of those who did not die by the end of the study period 12.5 % received HPC services. A conservative estimate, therefore, in terms of estimating additional patients who might be appropriate for referral to HPC, is that approximately one third of patients who met the threshold condition received HPC within VA. This implies that nationally two thirds of cancer inpatients who might benefit from HPC according to this measure are not receiving these services. Of those receiving HPC, 45 percent received them two weeks or less before they died (not shown).

Discussion

This analysis was an initial step for the VA acute inpatient system as a whole in trying to identify patients at high risk of death. The survival analysis for patients admitted to the hospital with cancer after at least a year with no treatment for cancer in the VA system identified which of these populations (by diagnosis and age) have a 50% or greater probability of dying within a year. Only about a third of these high-risk patients received HPC within the VA system during the study years.

This approach could be useful for clinicians in other hospital systems, where patients might present with cancer that has either been previously undiagnosed or is newly recurring. This analysis was not restricted to admissions where the cancer was the presenting cause of hospitalization; all inpatient diagnoses were searched for the codes that indicated cancer. Thus, attending physicians in non-VA hospitals can follow these suggestions of cancer patients for whom it may be most appropriate to give a palliative care consult or a referral to someone who can begin a discussion of benefits for hospice and comfort care. This approach is not as stringent as the Medicare requirement of predicted survival of six months or less.

Whether to offer hospice and palliative care as an option is a judgment call on the part of the physician and as part of a discussion with the patient and family. The physician's knowledge of the patient's individual circumstances and her knowledge of the trajectory of the patient's illness are of utmost importance in interpreting any recommendations. The intention of a case finding metric is to alert the physician to the possibility that it may be an appropriate time to discuss HPC with the patient and family members. HPC resources are scarce and selective targeting rather than trying to discuss HPC options with all patients could improve utilization.

Limitations

This initial analysis had several limitations. The category "all other cancers" includes ICD-9 codes 210-229, which indicate benign neoplasms. Analyses of Medicare data show that of all neoplasms approximately 8.4% are accounted for by these codes [8]. Given this low proportion, and given the likelihood that patients with a benign condition are less likely to die, inclusion of these patients did not cause inappropriate inclusions in the case-finding metric. Concerning the validity of the coding of v66.7 and TS96, the codes used to identify which patients received HPC, we recognize that coding practices are not consistent across the VA. Further, the services provided under the v66.7 code remains largely unknown. For example, some home-based primary care (HBPC) programs code a large number of their patients with the v66.7 code. Others use the code only for a subset of HBPC patients meeting specific palliative care criteria. Lack of consistency may lead to either underestimation or overestimation of the number of patients receiving hospice and palliative care [9,10].

A further limitation is the use only of the ICD-9 codes to identify the severity of the patients' cancers. Refinements could extend predictive factors to include biological measures such as stage of disease and laboratory results. This information is not generally available on a

national basis within VA, however. Individual VA (or non-VA) medical facilities that collect this data using the electronic medical record system could conduct their own analysis at the local level. Further refinements might include adding co-morbidities, functional status and length of stay. A separate analysis of outpatients with cancer is also important and could incorporate significant events in the course of the disease that might trigger a referral to HPC.

The analysis presented here is part of a larger project that in addition to analyzing patients with cancer looks at patients with chronic conditions such as congestive heart failure and chronic obstructive pulmonary disorder, patients in intensive care units, and patients in nursing homes. A comprehensive case-finding metric awaits further analysis of these patient groups as well as others that may as yet not be identified. Lastly, results are specific to the VA patient population and may not generalize broadly to other patient groups.

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Table 1: Median predicted months of survival (from index date), inpatient status, with and without indication of advanced disease

			Inpatient	
			With indication of advanced disease	Without indication of advanced disease
Cancer	Identifying ICD-9 code(s)	Indication of advanced disease (ICD-9 codes*)	Median # months (# of observations)	Median # months (# of observations)
Head, neck	141-148	196,197, or 198	30.1 (122)	22.1 (1,696)
Trachea, Bronchus, and Lung	162	197 or 198	3.1 (867)	11.0 (16,718)
Prostate	185	197 or 198	22.7 (108)	29.6 (5,973)
Colon	153	197 or 198	11.7 (168)	29.5 (5,610)
Liver	155	196,197, or 198	4.3 (59)	7.3 (2,870)
Pancreatic	157	196,197, or 198	6.2 (84)	6.8 (2,410)
Esophageal	150	196,197, or 198	1.6 (59)	10.1 (1,612)
Lymphomas	200-202	197 or 198	29.0 (28)	24.1 (3,101)
Acute Leukemias	204.0, 205.0, 206.0, 207.2, 207.8, 208.0			8.4 (1,425)
Melanoma	172	196,197, or 198	15.0 (21)	28.8 (387)
CNS (Central nervous system)	191			12.9 (1,275)
All other cancers	Remaining cancer ICD-9 codes (140-239)	197 or 198	6.2 (2,363)	23.3 (49,959)

*ICD-9 196 = Secondary and unspecified malignant neoplasm of lymph nodes; ICD-9 197 = Secondary malignant neoplasm of respiratory and digestive systems; ICD-9 198 = Secondary malignant neoplasm of other specified sites for example (kidney, brain, skin, bone...)

Table 2: Median predicted months of survival (from index date) by age – Inpatients with indication of advanced disease

	<=50	51-60	61-70	71-75	76-80	81-85	>85
Cancer	Median (Number)	Median (Number)	Median (Number)	Median (Number)	Median (Number)	Median (Number)	Median (Number)
Head, neck	35.9 (13)	32.6 (47)	27.5 (40)	25.2 (6)	21.8 (12)	20.1 (3)	15.1 (1)
Trachea, Bronchus, and Lung	8.8 (48)	6.1 (240)	3.1 (289)	0.4 (140)	-1.3 (101)	-2.7 (41)	-4.7 (8)
Prostate	51.0 (2)	42.1 (19)	33.3 (15)	23.3 (22)	17.7 (16)	14.4 (25)	7.8 (9)
Colon	21.9 (12)	17.5 (50)	11.7 (39)	7.7 (20)	4.8 (29)	1.9 (14)	-1.6 (4)
Liver	8.2 (6)	5.9 (17)	4.2 (20)	2.0 (11)	0.4 (4)	-0.3 (1)	
Pancreatic	10.9 (5)	8.4 (31)	5.7 (18)	3.5 (13)	1.8 (7)	0.9 (8)	-0.2 (2)
Esophageal	5.2 (3)	3.3 (16)	1.7 (20)	0.3 (7)	-0.4 (7)	-1.4 (5)	-2.3 (1)
Lymphomas	43.5 (1)	38.9 (4)	32.2 (9)	26.5 (7)	24.4 (3)	20.2 (3)	16.0 (1)
Acute Leukemias							
Melanoma	22.1 (2)	16.3 (11)	11.9 (2)	9.3 (2)	6.6 (3)	3.9 (1)	
CNS (Central Nervous System)							
All other cancers	15.8 (169)	11.2 (697)	6.2 (640)	1.6 (317)	-1.2 (304)	-3.5 (171)	-6.8 (64)

Table 3: Median predicted months of survival (from index date) by age – Inpatients without indication of advanced disease

	<=50	51-60	61-70	71-75	76-80	81-85	>85
Cancer	Median (Number)	Median (Number)	Median (Number)	Median (Number)	Median (Number)	Median (Number)	Median (Number)
Head, neck	29.3 (129)	25.6 (576)	21.4 (457)	17.7 (223)	15.4 (175)	13.6 (107)	11.3 (29)
Trachea, Bronchus, and Lung	18.0 (579)	15.4 (3,457)	12.0 (4,835)	9.7 (2,943)	8.0 (2,946)	6.6 (1,525)	5.0 (433)
Prostate	61.7 (77)	50.7 (646)	40.7 (1,144)	32.9 (963)	27.4 (1,298)	21.8 (1,169)	16.3 (676)
Colon	44.0 (175)	38.2 (998)	33.0 (1,331)	28.9 (917)	26.0 (1,048)	23.1 (810)	20.2 (331)
Liver	11.2 (301)	9.4 (940)	6.6 (674)	4.8 (358)	3.5 (349)	2.4 (198)	0.9 (50)
Pancreatic	13.3 (122)	10.8 (551)	7.9 (577)	5.9 (389)	4.5 (390)	3.3 (273)	1.9 (108)
Esophageal	13.3 (69)	11.9 (444)	10.4 (441)	9.0 (253)	8.2 (229)	7.3 (142)	6.5 (34)
Lymphomas	40.3 (358)	32.5 (712)	26.2 (671)	20.6 (451)	17.0 (470)	13.5 (333)	10.7 (106)
Acute Leukemias	24.1 (87)	17.1 (262)	11.3 (336)	7.3 (237)	4.4 (278)	2.1 (155)	-1.4 (70)
Melanoma	39.5 (23)	35.0 (72)	31.0 (87)	27.9 (63)	25.7 (70)	24.0 (54)	21.1 (18)
CNS (Central Nervous System)	24.3 (146)	17.8 (357)	12.4 (327)	8.0 (153)	5.3 (166)	2.6 (96)	-0.1 (30)
All other cancers	36.3 (4,091)	30.1 (11,780)	25.0 (11,926)	20.5 (7,013)	17.7 (7,807)	14.9 (5,240)	12.0 (2,102)

Table 4: Preliminary recommendations for conditions to include in the case finding metric – Acute Settings

Cancer	Identifying ICD-9 code(s)	Indication of advanced disease (ICD-9 codes*)	Inpatient w/indication of advanced disease Age (n over 5 years)	Inpatient without indication of advanced disease Age (n over 5 years)
Head, neck	141-148	196,197, or 198		>85 (29)
Trachea, Bronchus, and Lung	162	197 or 198	All ages (867)	61+ (12,682)
Prostate	185	197 or 198	>85 (9)	
Colon	153	197 or 198	61+ (106)	
Liver	155	196, 197 or 198	All ages (59)	All ages (2,870)
Pancreatic	157	196, 197 or 198	All ages (84)	51+ (2,288)
Esophageal	150	196, 197 or 198	All ages (59)	51+ (1,543)
Lymphomas	200-202	197 or 198		>85 (106)
Acute Leukemias	204.0, 205.0, 206.0, 207.2, 207.8, 208.0			61+ (1,076)
Melanoma	172	196, 197 or 198	61+ (8)	
CNS (Central Nervous System)	191			71+ (445)
All other cancers	Remaining cancer ICD-9 codes	197 or 198	51+ (2,193)	>85 (2,102)

* ICD-9 196 = Secondary and unspecified malignant neoplasm of lymph nodes; ICD-9 197 = Secondary malignant neoplasm of respiratory and digestive systems; ICD-9 198 = Secondary malignant neoplasm of other specified sites for example (kidney, brain, skin, bone...)